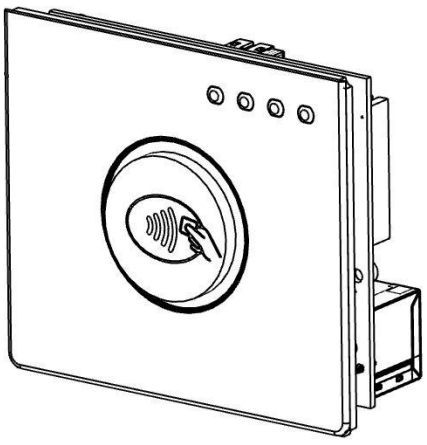
PAYMENT

FEIG

Installation

# cVEND plug

**Terminal for Contactless Payment and Ticketing**



# Note



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With the edition of this document, all previous editions become void. Indications made in this manual may be changed without previous notice.



Composition of the information in this document has been done to the best of our knowledge. FEIG ELECTRONIC GmbH does not guarantee the correctness and completeness of the details given in this manual and may not be held liable for damages ensuing from incorrect or incomplete information. Since, despite all our efforts, errors may not be completely avoided, we are always grateful for your useful tips.

The instructions given in this manual are based on advantageous boundary conditions. FEIG ELECTRONIC GmbH does not give any guarantee promise for perfect function in cross environments and does not give any guaranty for the functionality of the complete system which incorporates the subject of this document.

FEIG ELECTRONIC call explicit attention that devices which are subject of this document are not designed with components and testing methods for a level of reliability suitable for use in or in connection with surgical implants or as critical components in any life support systems whose failure to perform can reasonably be expected to cause significant injury to a human. To avoid damage, injury, or death, the user or application designer must take reasonably prudent steps to protect against system failures.
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# Contents

# 1 About this Manual

These instructions describe the integration, assembly and connection of the cVEND plug. The instructions are intended both for developers who want to integrate the payment terminal into the target system and for trained service staff who are tasked with operating and/or maintaining the cVEND plug.

# 2 Safety Instructions

- ► The device may only be used for the intended purpose designed for by the manufacturer.
- ► The operation manual should be conveniently kept available at all times for each user.
- ► Unauthorized changes and the use of spare parts and additional devices which have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.
- ► The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or automatically set parameters for a device or for an incorrect application of a device.
- ► Repairs may only be executed by the manufacturer.
- ► Installation, operation, and maintenance procedures should only be carried out by qualified personnel.
- ► Use of the device and its installation must be in accordance with national legal requirements and local electrical codes.
- When working on devices the valid safety regulations must be observed.
- Special advice for carriers of cardiac pacemakers:

  Although this device doesn't exceed the valid limits for electromagnetic fields you should keep a minimum distance of 25 cm between the device and your cardiac pacemaker and not stay in an immediate proximity of the device respective the antenna for some time.

# 3 Product use

The cVEND plug is a universal payment Terminal to accept debit and credit cards (Open-Loop) as well as closed loop systems that can be operated independently. With optional expansion modules and housing components, the cVEND plug can be adapted for different environments.

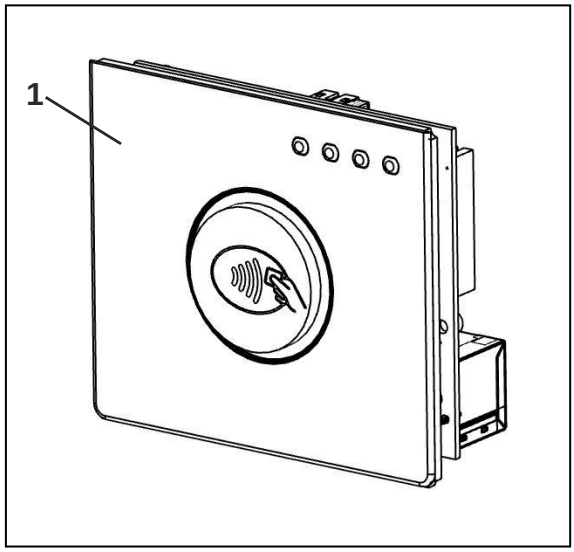
## 3.1 Product Versions

cVEND plug is available in different versions which are shown in the following table:

| Order-No. | EMVCo L1 compliance | L3 Payment App | Memory RAM / FLASH MByte | LAN connector X1 | RGB Interface X6 |
|---|---|---|---|---|---|
| 4302.041.xx | 2.6b | Custom | 128 / 256 | X | - |
| 4302.042.xx | 2.6b | FEIG | 128 / 256 | X | - |
| 4302.044.xx | 2.6b | Custom | 256 / 512 | X | X |
| 5926.041.xx | 3.0a | Custom | 128 / 256 | X | - |
| 5926.042.xx | 3.0a | FEIG | 128 / 256 | X | - |
| 5926.044.xx | 3.0a | Custom | 256 / 512 | X | X |
| 5926.049.xx | 3.0a | Custom | 128 / 256 | - | - |

# 4 Scope of delivery

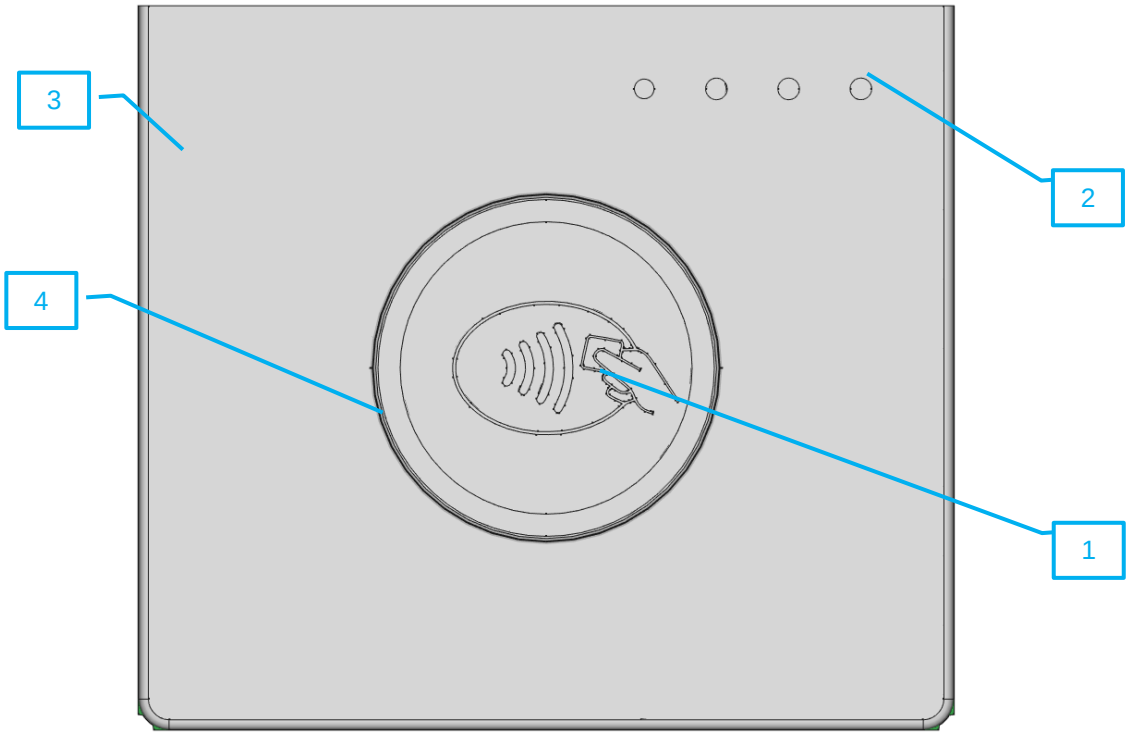
All components and individual parts supplied with the respective article are described below.




| Pos. | Description | Quantity |
|---|---|---|
| **1** | cVEND plug | 1 |

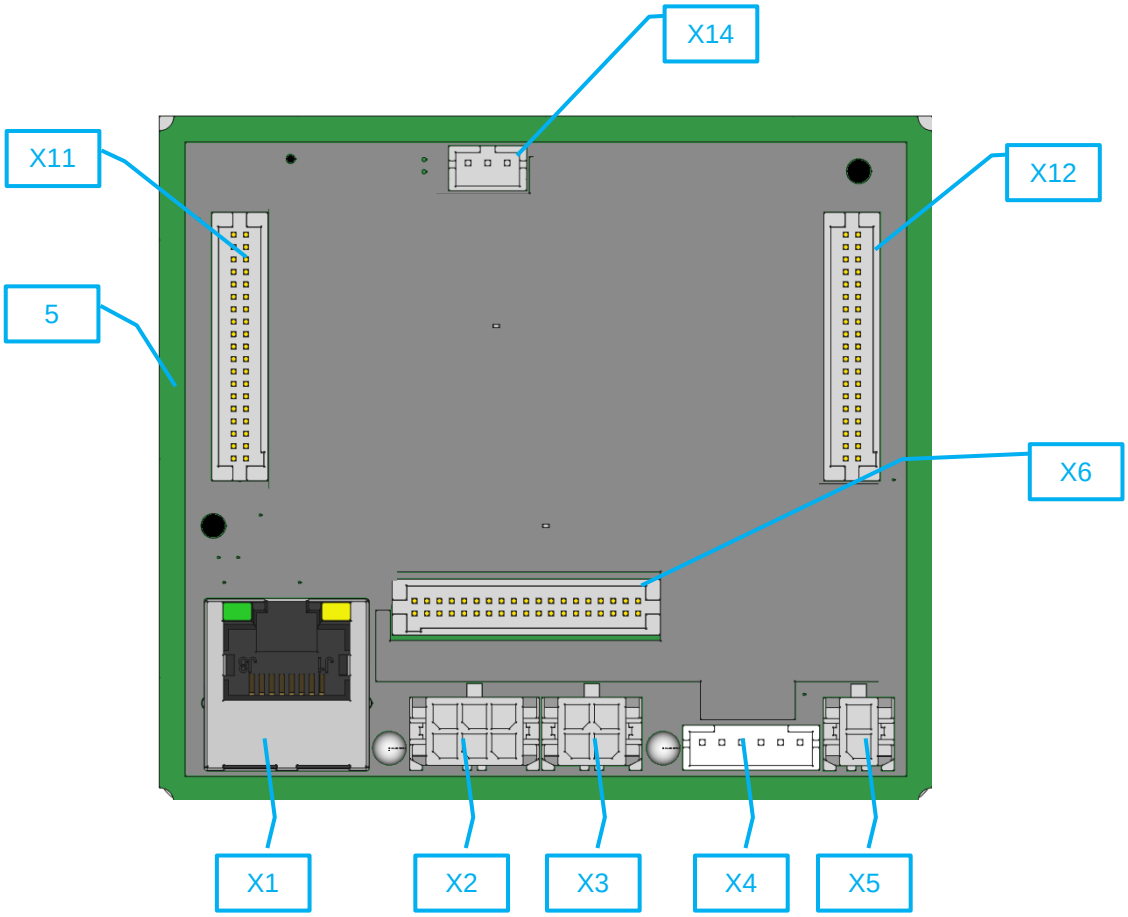
# 5 Functional Elements

## 5.1 Front Side




| Label | Description |
|---|---|
| **1** | Contactless symbol |
| **2** | LED |
| **3** | NFC antenna |
| **4** | Sealing |

## 5.2 Back Side




| Label | Description |
|---|---|
| **5** | Wrap around mounting edge |
| **X1** | LAN-/Ethernet Interface (10/100 Base-T) |
| **X2** | USB Device Interface |
| **X3** | serial Interface RS232 V.24 (UART#1) |
| **X4** | RS232-LVTTL (UART#0) Interface |
| **X5** | Voltage supply 5V DC |
| **X6** | RGB Interface (optional) |
| **X11** | Connector for Piggyback Extension Boards |
| **X12** | Connector for Piggyback Extension Boards |
| **X14** | serial Interface RS232-LVTTL (UART#2) |

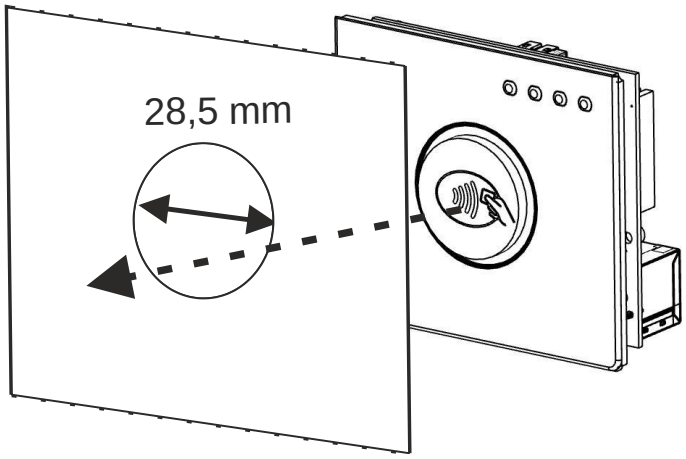
# 6 Installation

The cVEND plug can be installed flush in a non-conductive front plate.

The front plate thickness must be 3 mm.

A round opening with a diameter of 28.5 mm is required for installation.

The cVEND plug must be installed in the housing from the inside. If the LEDs of the cVEND plug are to be used, additional light channels must be provided




***NOTICE***

***To comply with EMVCo regulations:***

- ***The contactless logo must be visible.***
- ***The upper edge of the cVEND plug plastic dome and the target terminal front plate must be on the same level.***
- ***Avoid any kind of conductive material in the vicinity of the cVEND plug antenna.***
- ***Do not use conducting materials for fastening.***

The cVEND plug front consists of a silicone rubber mat with integrated sealing lip and a fixed plastic dome made of polycarbonate, which shows the backlit contactless symbol.

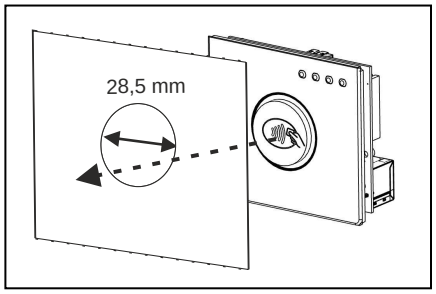
For mounting, the cVEND plug front must be pressed firmly against the front of the housing. A clamping range of 2.5 mm is available for this purpose (see 5.2, fastening area (5), shown in green) on all sides of the cVEND plug antenna board. For detailed dimension see 11.1  3D STEP Data are available on request.

## 6.1 Mounting

Prerequisite:

A corresponding fastening unit must be available on the target system for fastening the cVEND plug.

1. Remove protection foil from plug




2. Push the cVEND plug through the hole from the inside
3. Attach the cVEND plug to the front of the machine.
   Make sure that only the antenna of the cVEND plug is used for mounting

- cVEND plug is mounted

# 7 Electrical connections

***ATTENTION***

**The device can be damaged by a short circuit.**

Only connect electrical connections when the device is de-energized.

Depending on the equipment, the device can be equipped with different interfaces to which various functions can be assigned.

## 7.1 X1 – LAN-/Ethernet Interface

The LAN/Ethernet interface can be used for communication depending on application.

To ensure reliable operation, it is recommended to connect the LAN/Ethernet interface with a CAT 5 cable or higher.

Required connector type: RJ45

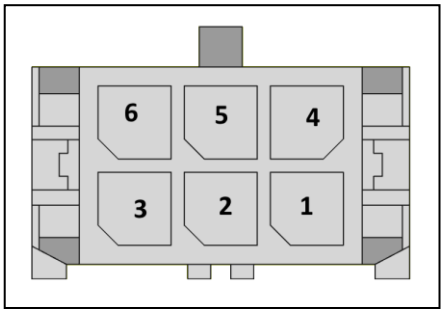
## 7.2 X2 – USB Device Interface

The USB device interface can be used for communication depending on application and is usable as virtual COM-Port (CDC-ACM) and networking device (CDC-ECM).

**NOTE**

- *The USB interface is specified for max. 3 m (9,84 ft) cable length.*

PIN-Assignment:




| PIN | Label | Direction |
|---|---|---|
| **1** | DEV-Vcc | I |
| **2** | DEV-D- | I/O |
| **3** | DEV-D+ | I/O |
| **4** | N.C. | - |
| **5** | GND | - |
| **6** | Shield | - |

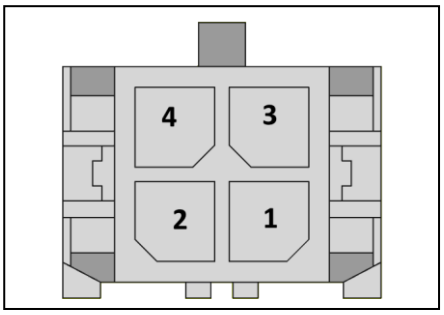
Required connector type: Molex Micro Fit 43025-0600, 6-pole plug and the related crimp contact

## 7.3 X3 – Serial Port RS232 V.24 (UART#1)

The serial interface RS232 V.24 (UART#1) can be used by the application.

The interface is an RS232 Interface on V.24 level.

PIN-Assignment:

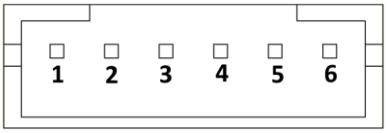



| Pos | Label | Direction |
|---|---|---|
| 1 | Device RXD | I |
| 2 | Device TXD | O |
| 3 | Wake-UP | I/O |
| 4 | GND | - |

Required connector type: Molex Micro Fit 43025-0400, 4-pole and the appending related crimp-contact

## 7.4 Connector X4 - RS232-LVTTL (UART#0) Interface

At connector X4 a RS232 interface on LVTTL 3.3V level is provided. This interface offers also a hardware flow control.




| PIN | Description | Direction | Comment |
|---|---|---|---|
| 1 | Device RTS | O | |
| 2 | GND | - | |
| 3 | Device RXD | I | |
| 4 | Device TXD | O | |
| 5 | Device CTS | I | |
| 6 | Wake-Up | I/O | s. 0 Wake-Up |

Required connector type: JST PHR-6 - housing, 6-pole, grid dimension 2.0 mm, Single Row and

JST SPH-002T-P0.5 or SPH-004T-P0.5 Crimp contact

***NOTE:***

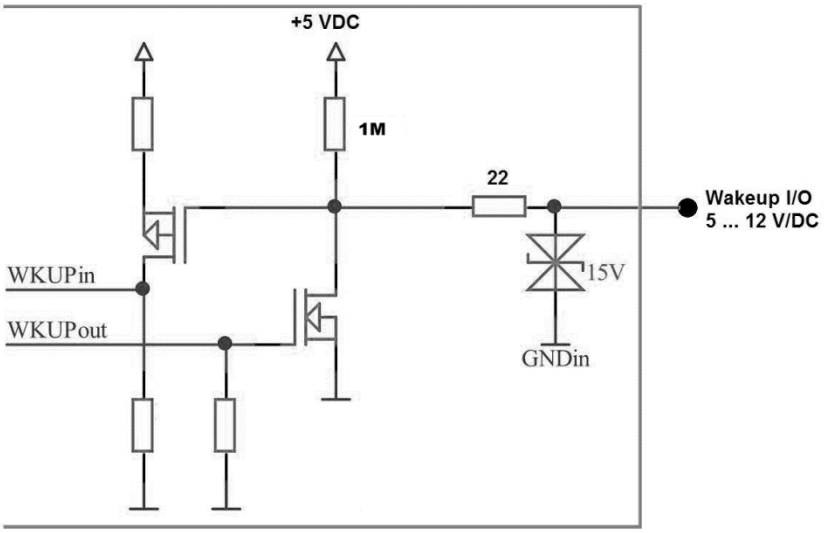
***The length of the cable to the RS232-LVTTL interface should be kept as short as possible, and must in any case not exceed 3 m.***

### 7.4.1 Wake-Up

cVEND offers a standby mode which can be configured via software commands. If standby is activated the bidirectional Wake-Up I/O is used for signaling a wake-up event by the cVEND and can be used by the host to activate the cVEND.

Wake-Up by host:

The host controller can awake the cVEND by pulling down the Wake-Up line.




***NOTE:***

***If the standby - Wake-Up option is used in connection with the USB interface the USB connection will be interrupted while standby mode.***

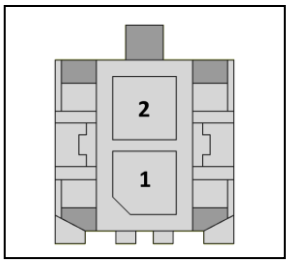
## 7.5 – Power Supply Vcc

**ATTENTION**

**For cVEND module integration the following recommendations must be followed**

- **Device can be damaged by incorrect polarity or excessive voltage.**
- **Observe correct polarity.**
- **Use only a stable regulated supply voltage according to the voltage and ripple specification given in the data sheet.**
- **The device must be supplied by a limited power supply according EN 62368-1 PS1, only!**
- **The cable length from the power supply should be as short as possible**

Polarity of power supply:




| PIN | Label | Direction | Comment |
|---|---|---|---|
| **1** | Vcc | I | 5,0 V/DC |
| **2** | GND | - | |

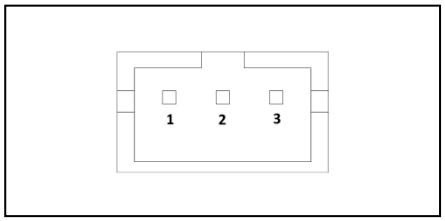
Required connector type: Molex Micro Fit 43025-0200, 2-pole and related crimp contact

cVEND plug is specified for a supply voltage between 5,0 and 5,5 V. A supply voltage between 4.0 V and 2.5 V during the switch-on and switch-off phase is particularly critical for a possible malfunction of the device and should be passed through in < 10 ms. The voltage should be strictly monotonic and without overshoot and/or undershoot into the critical range.

## 7.6 Connector X14 – Serial Debug Port

At connector X14 a serial interface (UART#2) on LVTTL 3.3V level is provided. On development devices this port is used as Linux Console. On secure productive devices this interface has no function.

PIN-Assignment:




| PIN | Label | Direction | Comment |
|---|---|---|---|
| **1** | GND | - | |
| **2** | Device RXD | I | |
| **3** | Device TXD | O | |

Required connector type: Molex Micro Fit 43025-0400, 3-pole and the appending related crimp-contact; JST SPH-002T-P0.5 or SPH-004T-P0.5 Crimp contact

# 8 Signals

This chapter describes the signals generated by the cVEND operating system. Any further LED indications are described in the respective application-specific commissioning instructions.

| | |
|---|---|
| 1 x beep | Indicates that the cVEND is powered and has started the boot process. The boot routine takes about one minute. |
|  | The yellow LED flashes during the boot process. |
| 1 x  1 x beep | The boot process is complete when all four green LEDs light up once and a signal tone sounds. |

# 9 Security tamper

The terminal has an integrated battery-powered logic for detecting tampering attempts. If a tampering attempt is detected, the terminal deletes the entire sensitive key material and enters the 'TAMPER DETECTED' state. Reactivation is only possible by the manufacturer in a certified secure environment.

When the terminal is switched on, it reports the detected tampering attempt as follows:

| | |
|---|---|
|  beep ... beep ... beep | Tamper Event<br>• The red light lights up.<br>• The buzzer emits beeps of 4 kHz every second.<br>• Manipulation message is sent cyclically on all serial interface with 57.600 baud, 8-N-1<br>• cVEND stops regular operation |

**NOTE**

In addition, read the instructions in the "cVEND Security-Policy", which can be found on the FEIG website in the download area.

***ATTENTION***

**Security keys in the device are deleted.**

- Do not tamper with the device, e.g. by forcible damage.
- Do not unscrew the device
- Device must not be used or stored outside the specified ambient temperature
- Do not remove or short circuit the integrated battery
- Do not cause a short circuit on the device
- Security keys can only be reactivated by FEIG Electronic

# 10 Cleaning and care

Always use soft cleaning cloths for cleaning and avoid using cleaning agents as far as possible. If cleaning agents are used, clean only with liquid soap.

Do not use any chemical, corrosive cleaning agents to avoid damaging the surface.

No maintenance is required for the cVEND plug and its extensions.

# 11 Technical Data

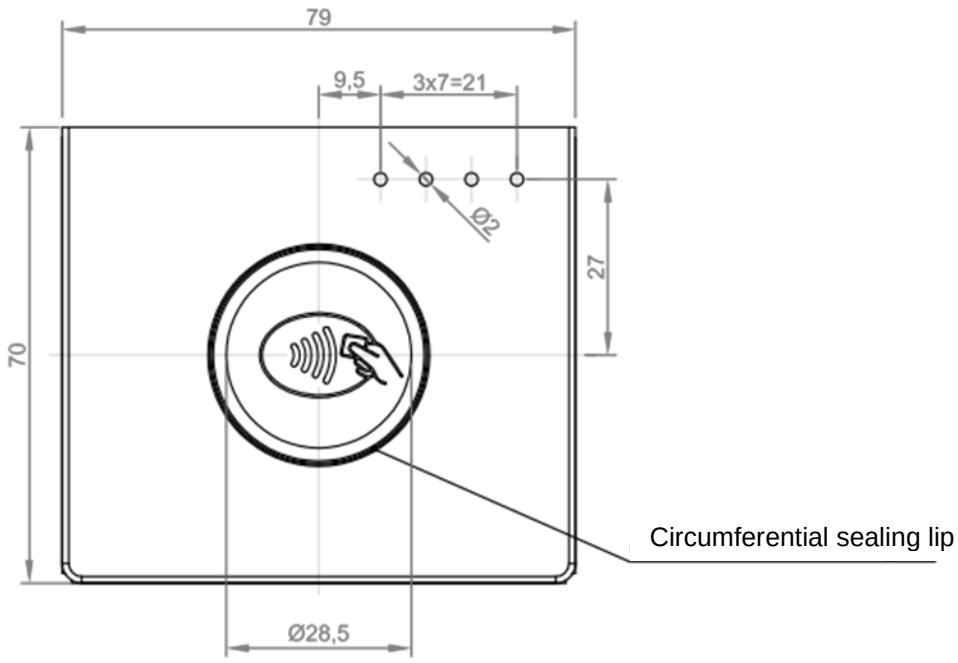
| | |
|---|---|
| **Housing** | • Module with front cover without housing (UL94 V-0)<br>• Front cover contactless symbol: Polycarbonate (Makrolon 6555), Plane: Silicon rubber<br>• Center frame: PA6 (UL94 V-0) |
| **Dimensions (W x H x D)** | • 79 x 70 x 31,1 mm (visible ∅ 28,5 mm) |
| **Weight** | • 85 g |
| **Temperature range** | • Operating: -30 °C bis +70 °C ambient temperature<br>• Storage: -30 °C bis +80 °C |
| **Humidity** | • 5% bis 95 % non-condensing (moisture protective coating optional) |
| **Protection Class** | • Frontside: IP65 (if accurate installed)<br>• Inside: IP00 |
| **Pollution Degree** | • DIN EN IEC 62368-1: Grade 2 |
| **Shock and Vibration** | • Class 5M3 according to IEC 60068-2-6 / IEC 60068-2-27 |
| **Vandalism Protection** | • IEC 62262, IK10 (installed in equivalent robust housing) |
| **Electrostatic discharge** | • ISO 10605, Category 3 |
| **Power Supply** | • 5,0 to 5,5 V DC (Ripple < 80 mVpp) |
| **Power consumption operation** | • typ. < 1 A, peripherals excluded |
| **Low power standby mode** | • Power consumption < 1 mA (depending on hardware configuration and wake-up mode)<br>• Wake-up by digital input and time controlled |
| **RFID Interface** | • Integrated Antenna<br>• 13,56 MHz<br>• Transmission power <= 1 W<br>• ISO/IEC 14443-A / -B (NFC Read/Write module) in EMVCo contact-less mode<br>• ISO/IEC 15693 |
| **Supported Transponder** | • ISO/IEC 14443-4 compliant smart cards, NFC Type 1, 2 und 4 in card-emulation mode, Mifare classic, Mifare ultralight and Sony Felica. Further technologies on request<br>• ISO/IEC 15693 UID and mandatory commands |
| **Peripheral interfaces** | • Ethernet - IEEE 802.3/Ethernet, 10/100 Mbps (optional)<br>• RS232 (V.24)<br>• USB 2.0 Device |
| **User interfaces** | • 6 LED (4 green, 1 red, 1 yellow), Buzzer, illuminated payment logo |
| **CPU and security** | • ARM 9 CPU – Tamper protected and side channel attack resistant with real time memory encryption<br>• True random number generator<br>• Real time clock – battery backed (20 ppm accuracy) |

| | |
|---|---|
| **Memory** | • Standard: RAM MByte 128 / FLASH MByte 256<br>• Optional: RAM MByte 256 / FLASH MByte 512 |
| **Battery** | • 3 V Lithium Battery, 540 mAh, Lifetime 15 years at 25 °C[1] |
| **MTBF at 55 °C (EN61709)** | • 100.000 h |
| **Operating system** | • Secure LINUX with cVEND Multi-Application architecture<br>• Fail-safe updates for operating system and application<br>• Crypto Plug-Ins to protect sensitive data |

| | |
|---|---|
| **Payment Approvals** | • EMVCo Contactless Level 1<br>• PCI PTS 5.x, SRED incl. Open Protocol |
| **Available Level 2 Kernel** | • Mastercard contactless V3.1.4<br>• VISA contactless V2.2. incl. transit V1.1<br>• American Express - Expresspay 4.0.3<br>• Discover D-PAS 2.0<br>• JCB contactless 1.5<br>• Union Pay contactless 2018<br>• RuPay - qSPARC 2.0.0<br>• PURE 2.1.8<br>• Bancomat contactless 2.2.0 |

[1] *The battery is used for the safety function and RTC. A higher ambient temperature leads to a shortened service life!*

## 11.1 Dimensions



# 12 Declaration of Conformity

## 12.1 Declaration of Conformity (CE)

| | |
|---|---|
| CE | Hereby FEIG ELECTRONIC GmbH declares that the radio equipment type **cVEND plug** is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: https://www.feig.de/en/service/eu-declarations-of-conformity/ |

## 12.2 Declaration of Conformity (UKCA)

| | |
|---|---|
| UK CA | Hereby FEIG ELECTRONIC GmbH declares that the radio equipment type **cVEND plug** is in compliance with Directive No. 1206 Radio Equipment Regulations 2017. The full text of the UKCA declaration of conformity is available at the following internet address: https://www.feig.de/en/service/ukca-declarations-of-conformity/ |

## 12.3 Radio Approval - USA (FCC) and Canada (IC)

| **Product name:** | cVEND plug | cVEND plug | cVEND plug |
|---|---|---|---|
| **FCC ID:**<br>**IC:** | PJMCVEND<br>6633A-CVEND | PJMCVNDA<br>6633A-CVNDA | PJMCVNDB<br>6633A-CVNDB |
| **PMN:**<br>**HVIN:**<br>**HMN:** | cVEND plug<br>-<br>- | cVEND plug<br>CVNDA PLUG<br>- | cVEND plug<br>CVNDB PLUG<br>- |
| **Notice for USA and Canada** | This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.<br>Operation is subject to the following two conditions.<br>(1) this device may not cause harmful interference, and<br>(2) this device must accept any interference received,<br>including interference that may cause undesired operation.<br>Unauthorized modifications may void the authority granted under Federal communications Commission Rules permitting the operation of this device.<br>This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.<br>Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :<br>(1) l'appareil ne doit pas produire de brouillage, et<br>(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement. | | |

| | |
|---|---|
| **Radiofrequency radiation exposure Information:** | This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.<br>This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.<br><br>Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de<br>20 cm de distance entre la source de rayonnement et votre corps.<br>Ce transmetteur ne doit pas être place au meme endroit ou utilise simultanement avec un autre transmetteur ou antenne. |

**Installation with FCC / IC Approval:**

FCC-/IC-NOTICE: To comply with FCC Part 15 Rules in the United States / with IC Radio Standards in Canada, the system must be professionally installed to ensure compliance with the Part 15 certification / IC certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States / Canada.

# 13 Optional Extensions

| | | |
|---|---|---|
| ***5487.000.01***<br>  | cVEND MH.F Modul housing - Front | Flush mounting housing for cVEND plug for installations in non-conducting surfaces (indoor and outdoor applications). A front sticker makes individual design possible.<br><br>Packaging unit: 10 pcs.<br><br>Accessories:<br><br>- cVEND plug (all Versions)<br>- #5495.000.01 cVEND MH.D – Distance frame<br>- #4328.000.00 - cVEND plug - SAM Extension Board<br>- #5486.000.00 - cVEND EXT.VEND Extension Board<br>- #5629.###.00 - cVEND Front Sticker |
| ***5495.000.01***<br>  | cVEND MH.D Modul housing – Distance frame | Distance frame for surface installations on conducting and non-conduction surfaces (indoor and outdoor in conjunction with cVEND MH.F Module housing – Front (#5487.000.00)<br><br>Packaging unit: 10 pcs.<br><br>Accessories:<br><br>- #5487.000.00 - cVEND MH.F – Front housing |
| ***5629.###.00***<br>  | cVEND Front Sticker for MH.F Front housing | Stickers with high scratch resistance<br><br>*5629.004.00* Front sticker - girocard logo<br>*5629.005.00* Front sticker - without logo<br><br>Packaging unit: 10 pcs.<br><br>Accessories:<br>#5487.000.01 - cVEND MH.F – Front housing |
| **4328.000.00**<br>  | cVEND plug SAM Extension Board | Piggyback Extension Board for cVEND plug with 4 * SAM Sockets (ID000) and 1 * Socket for microSD memory cards.<br><br>Packaging unit 1 pcs. |
| **4328.020.00**<br>  | cVEND plug SAM Extension Board (LL20) | Piggyback Extension Board for cVEND plug with 4 * SAM Sockets (ID000) and 1 * Socket for microSD memory cards.<br><br>Packaging unit 20 pcs. |